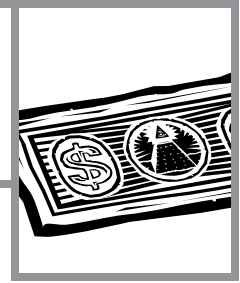


## Appendix G: Climate Change Benefits



By providing financial incentives to the RM contractor, a successful RM program increases waste diversion, reduces consumption of resources, and fosters source reduction in your organization. As a result, your impacts on climate change can be reduced in the following ways:

- Reducing the volume of waste sent to landfills and incinerators, which results in fewer methane emissions from landfills, and reduced carbon dioxide and nitrous oxide emissions from combustion.
- Minimizing the demand for virgin materials, thereby reducing energy consumption to extract, process, and manufacture the products from those virgin materials. The reduction in energy use minimizes fossil fuel consumption, thus resulting in fewer emissions of carbon dioxide and nitrous oxide.
- Slowing the logging of trees and hence maintaining the carbon dioxide storage capacity provided by forests.

An EPA report—*Solid Waste Management and Greenhouse Gases (GHG): A Life Assessment of Emissions and Sinks*<sup>3</sup>—provides greenhouse gas (GHG) emission factors for 16 types of materials under different waste management strategies, including source reduction, recycling, landfilling, incineration, and composting. Based on the level of waste diversion and source reduction through RM contracting, you can quantify the GHG reductions from increased waste diversion or source reduction by using these emission factors. The following table lists the GHG emission factors presented in metric tons of carbon equivalent (MTCE)<sup>4</sup>.

Periodic calculations based on measured diversion results should be performed to evaluate the actual effectiveness of your RM program on mitigating GHG emissions. These calculations may be something delegated to the RM contractor as part of the normal reporting process.

<sup>3</sup> The report is downloadable at: <http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteToolsReports.html>

<sup>4</sup> The report also presents GHG emission factors in metric tons of carbon dioxide.

## Appendix G: Environmental Benefits and Energy Savings

**Table G-1: Net GHG Emissions from Source Reduction and MSW Management Options—(MTCE/Ton)<sup>1</sup>**

Material	Source Reduction <sup>2</sup>	Recycling	Composting <sup>3</sup>	Combustion <sup>4</sup>	Landfilling <sup>5</sup>
Aluminum Cans	-2.49	-4.11	NA	0.02	0.01
Steel Cans	-0.79	-0.49	NA	-0.42	0.01
Glass	-0.14	-0.08	NA	0.01	0.01
HDPE	-0.49	-0.38	NA	0.23	0.01
LDPE	-0.61	-0.47	NA	0.23	0.01
PET	-0.49	-0.42	NA	0.28	0.01
Corrugated Cardboard	-0.51	-0.71	NA	-0.19	0.08
Magazines/Third-class Mail	-1.04	-0.74	NA	-0.13	-0.12
Newspaper	-0.81	-0.95	NA	-0.21	-0.21
Office Paper	-0.80	-0.68	NA	-0.18	0.62
Phonebooks	-1.28	-0.91	NA	-0.21	-0.21
Textbooks	-1.23	-0.75	NA	-0.18	0.62
Dimensional Lumber	-0.55	-0.67	NA	-0.22	-0.10
Medium-density Fiberboard	-0.60	-0.67	NA	-0.22	-0.10
Food Discards	NA	NA	-0.05	-0.05	0.17
Yard Trimmings	NA	NA	-0.05	-0.06	-0.09
Mixed Paper					
Broad Definition	NA	-0.67	NA	-0.19	0.10
Residential Definition	NA	-0.67	NA	-0.18	0.07
Office Paper Definition	NA	-0.83	NA	-0.17	0.15
Mixed Plastics	NA	-0.41	NA	0.25	0.01
Mixed Recyclables	NA	-0.76	NA	-0.17	0.05
Mixed Organics	NA	NA	-0.05	-0.06	0.03
Mixed MSW as Disposed	NA	NA	NA	-0.04	0.07

*Note that totals might not add due to rounding and more digits might be displayed than are significant.*

*NA: Not applicable, or in the case of composting of paper, not analyzed.*

<sup>1</sup> *MTCE/ton: Metric tons of carbon equivalent per short ton of material. Material tonnages are on an as-managed (wet weight) basis.*

<sup>2</sup> *Source reduction assumes initial production using the current mix of virgin and recycled inputs.*

<sup>3</sup> *There is considerable uncertainty in our estimate of net GHG emissions from composting; the values of zero are plausible values based on assumptions and a bounding analysis.*

<sup>4</sup> *Values are for mass burn facilities with national average rate of ferrous recovery.*

<sup>5</sup> *Values reflect estimated national average methane recovery in year 2000.*

*\* Excerpted from Solid Waste Management and Greenhouse Gases: A Life Assessment of Emissions and Sinks, Exhibit ES-4.*

Using the GHG emission factors from the EPA report, the Agency has also developed a user-friendly spreadsheet tool, WASTE Reduction Model (WARM), to help companies calculate the GHG impact of waste reduction or recycling activities. By simply entering the baseline waste generation and recycling information, the tonnage of waste disposed, source reduced, and recycled after the implementation of

## **Appendix G: Environmental Benefits and Energy Savings**

RM, and some information about the current waste management system, the tool can generate an estimate of the net GHG impact. This model could also estimate the energy impact of an RM program. A Microsoft Excel and Web-based version of this tool is available online at <<http://yosemite.epa.gov/oar/globalwarming.nsf/content/ActionsWasteWARM.html>>.